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DOCUMENTATION FOR THE

MACHINE-READABLE VERSION OF THE

LOWELL PROPER MOTION SURVEY

THE G NUMBERED STARS

NORTHERN HEMISPHERE

(NASA-TM-84774) DOCDMENTATION FOR THE N82-30200 MACHINE-READABLE VERSION OF THE LOWELL PROPER MOTION SURVEY NORTHERN HEMISPHERE, THE G NCMBERED STARS (NASA) 18 p Unclas HC A02/MF A01 CSCL 03A G3/89 28469

MAY 1982

DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF THE

LOWELL PROPER MOTION SURVEY

Northern Hemisphere

THE G NUMBERED STARS

Wayne H. Warren Jr.

May 1982

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

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SECTION 1 - INTRODUCTION

This Lowell Proper Motion Survey catalog contains a summary of many individual papers published in the Lowell Observatory Bulletins in the years 1958 to 1970. The data in the machine-readable version include observed positions, proper motions, estimated photographic magnitudes and colors, and references to identifications in other catalogs. Photoelectric data on the UBV system are included for many stars, but no attempt was made to find all existing photometry. The machine version contains all data of the published catalog, except the Lowell Bulletin numbers where finding charts can be found.

This document describes the machine-readable catalog available from the Astronomical Data Center. It is intended to enable users to read and process the data without problems and guesswork. For additional details concerning the observing program the source reference and original Lowell Bulletins should be consulted. This document should be distributed with any machine-readable copy of the catalog.

SOURCE REFERENCE

Giclas, H. L., Burnham, R. Jr., and Thomas, N. G. 1971, Lowell Proper Motion Survey, Northern Hemisphere, The G Numbered Stars (Flagstaff: Lowell Observatory).

SECTION 2 - TAPE CONTENTS

A byte-by-byte description of the contents of the Lowell Proper Notion Survey catalty is given in Table 1. The suggested format specifications apply to FORTRAN formatted reads and can be modified depending upon individual programming and processing requirements. Since data fields are blank where values are missing, care must be exercised when processing data which have valid zero values, e.g. color indices. It is suggested that these fields be read initially with character (A) format specifications and checked for blanks if they are to be used for calculations or search purposes. Although decimal points are omitted from the data records for many real numbers, real format specifications are given in the table to indicate the locations of the decimal points. Alternate format specifications are given in parentheses.

Table 1. Tape Contents. Lowell Proper Motion Survey, Northern Hemisphere.

Byte(s)	Units	Suggested Format	Description
1-8		84	Original G number assigned to the star on the plate region where it was first found. Stars which were subsequently found on later plates were assigned new G numbers; however, in this catalog all duplicate observations have been combined and averaged with the original G numbers retained. Byte 1 of the field always contains a "G" and byte 5 always contains a "-". The number in bytes 2-4 is the plate number, while that in bytes 6-8 is the star number on the plate.
9-10	hours	12	Right ascension, a, equinox 1950. Epochs are given for plate regions in the original Lowell Bulletin numbers reported in the CHT column of the published catalog. These references are not included in the machine-readable version.
11-12	min	12	α
13-14	sec	12	α
15-17	o	I3 (A1,I2)	Declination, δ , equinox 1950.
18-20	•	F3.1	δ
21-24	10	F4.2	Annual proper motion μ .

Byte(s)	Units	Suggested Format	Description
25-27	6	13	The position angle of μ , measured in the normal way from North through East.
28-30	mag	F3 • 1	m_{pg} , the estimated photographic magnitude.
31-32	and and and	12	Estimated color class on a scale of -1 (bluest) to +4 (reddest). Almost all stars having color class -1 have subsequently been classified as white dwarfs. An approximate relationship between estimated color and UBV colors is given in the published catalog.
33-34	inch and time	12	Number of observations from different plate regions contained in the mean. A value of unity denotes a single observation from one plate pair. Actually, there are never as many as ten observations, so byte 33 is always blank.
35	quant design quain	1 x	Blank
36-70		35A1	or equivalent. References for other sources containing information and/or data about the star. References are separated by blank characters and consist mainly of designations in other catalogs. A symbol "+" following the last reference indicates additional references in the notes to the catalog. The reference key is given in Table 2.
71	200 CE Lug	1 x	Blank
72	case case gap	A1	An asterisk (*) indicates that there is a note in the published catalog which gives additional information about the star.
73	100 mm .md	A1	A code indicating if the star is on the parallax program of some observatory, thus denoting the possibility that a trigonometric parallax may eventually be available. The following codes are employed: A (Allegheny Obs.), L (Lick), M (Leander McCormick), N (U.S. Naval), S (Sproul), V (Van Vleck), Y (Yerkes). A digit of > 2 (= n) indicates the star to

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
			be on the working lists of n observatories. The codes for the n observatories are listed in Table 3.
74	part and que	1%	Blank
75-79	mag	F5•2	Photoelectric V magnitude obtained from the source given in bytes 95-97. UBV data are given for reference purposes only and no attempt for completeness has been made. Blank if no data reported.
80	em tois ima	1X	Blank
81-85	mag	F5.2	B-V color (blank if no data). Sign always in byte 81, except for 0.00 values.
86	Stand stade	1x	Blank
87= 91	mag	F5.2	U-B color (blank if no data). Sign always in byte 87, except for 0.00 values.
92-94	stat anti proj	зх	Blank
95-97	200 MA MA	АЗ	Reference code for the magnitude source. The reference key is given in Table 4. A digit > 2 denotes multiple references (given in the notes). Note: the appended minus signs on some codes are not explained in the published catalog.
98		1 x	Blank

Table 2. Lowell Proper Motion Survey, Northern Hemisphere. Key to Reference Abbreviations.

AVK	Alden, H L. and Van de Kamp, P. 1924, Astron. J. 35, 165.
DE	number with asterisk, Bergedorf Eigenbewegungs-Lexicon 1936, Hamburger Sternwarte in Bergedorf or the continuation (Heidi, V. J. 1950, Astron. Nach. 279, 273).
BD	number with (L). Luyten, W. J. 1942, Publ. Astron. Obs., Univ. of Minnesota II, No. 12; 1944, III, No. 4.
врм	Luyten, W. J. 1963, Bruce Proper Motion Survey: The General Catalogue, Vols. I and II (Minneapolis: Univ. of Minnesota).
CI	Porter, J. G., Yowell, E. I. and Smith, E. 1915, Publ. Cincinnati Obs. 18; 1930, 30.
E	Ebbighausen, E. G. 1938, Astron. J. 47, 112.
.FI, FII, FIII	Furuhjelm, R. 1916, Acta. Soc. Sci. Fennicae 48, No. 1; 1926, 50, No. 7; 1947, Ser. A, 3, No. 12.
GL	Gliest, W. 1969, Catalogue of Nearby Stars, Veröff. Astron. Rechen-Inst. Heidelberg, No. 22.
GOYAL	Goyal, A. N. 1962, Astron. Nach. 286, 196.
GRN	Van Rhijn, P. J. and Plaut, L. 1955, Publ. Kapteyn Astron. Lab., Gröningen, No. 56.
Н	Hertzsprung, E. 1918, Astron. Nach. 207, 171.
HL	Haro, G. and Luyten, W. J. 1960, Bull. Tonantzintla y Tacubaya, No. 19, 16.
HUB	Hubble, E. P. 1976, Astron J. 29, 168.
HYD	Contained in one of the lists published by the Hyderabad observers in Astron. Nach., Mon. Not., or Astron. Nach. B.Z.
30	Contained in one of the many lists of proper motion stars in the Astrographic zones published in J. des Observateurs, principally by the Nizamiah and Bordeaux Observatories.
к1	Karpov, B. G. 1937, Publ. Astron. Soc. Pacific 49, 146.
K2	Karpov, B. G. 1937, Astron. J. <u>46</u> , 201.
KÖNIG	König, A. 1953, Astron. Nach. <u>281</u> , 107.

Table 2. (continued)					
KOPAL	Kopal, Z. 1939, Harvard Bull. No. 911, p. 28.				
L	Luyten, W. J. 1942, Publ. Astron. Obs., Univ. of Minnesota II, No. 12; 1944, III, No. 4.				
î.e	Luyten, W. J. and Ebbighausen, E. G. 1937, Astron. J. 45, 188.				
LFT	Luyten, W. J. 1955, A Catalogue of 1849 Stars With Proper Motions Exceeding 0"5 Annually (Minneapolis: Lund Press.)				
LP	Luyten, W. J. 1961-1967, Publ. Astron. Obs. Univ. Minnesota III, Nos. 8, 10, 11, 13-18, 20; 1963-1970, Proper Motion Survey with the Forty-eight Inch Schmidt Telescope (Minneapolis: University of Minnesota).				
LPM	Euyten, W. J. 1941, Publ. Astron. Obs., Univ. of Minnesota III, No. 1.				
LTT	Luyten, W. J. 1957, A Catalogue of 9867 Stars in the Southern Hemisphere with Proper Motions Exceeding O'. 2 Annually (Minneapolis: Lund Press).				
	Luyten, W. J. 1961, A Catalogue of 7127 Stars in the Northern Hemisphere with Proper Motions Exceeding O". 2 Annually (LTT 10001-17027) (Minneapolis: Lund Press).				
	Luyten, W. J. 1962, First Supplement to the LTT Catalogues (LTT 17028-18635) (Minneapolis: Lund Press).				
MC	1937, Publ. Leander McCormick Obs., Univ. of Virginia VII.				
ML	McLead, N. W. 1939, Pop. Astronomy 47, 455.				
OST	Costerhoff, P. Th. 1936, Astrophys. J. 83, 340.				
PUL	Deutsch, A. N. 1940, Publ. de l'Obs. Central a Poulkovo, Serie II, <u>LV</u> .				
R	Ross, F. E. 1925-1939, Astron. J. 36-48.				
RAD	1934, Radcliffe Catalogue of Proper Motions in the Selected Areas 1 to 115 (London).				
s	Strand, K. Aa., Lenham, A. and Owen, T. 1958, Astron J. 63, 337.				
T	1955, Ann. de l'Obs. Astron. Toulouse XXIII.				
VM	Van Maanen, A. 1915, Astrophys. J. 41, 187.				

Table 2. (co	ntinued)
VM1	Van Maanen, A. 1938, Astrophys. J. 88, 27 (Table 1).
VM2	Van Maanen, A. 1938, Artrophys. J. 88, 27 (Table 2).
VMW	Van Maanen, A. and Willis, H. C. 1930, Contrib. Mt. Wilson Obs., No. 412.
W	Wolf, M. 1919, Veröff Stornwarte zu Heidelberg 7, No. 10; 1919-1929, Astron. Nach. 209-236.
¥	Schlesinger, F. and Barney, I. 1939-1959, Yale Zone Catalogues, Trans. Astron. Obs., Yale Univ. 11-14, 16-27.

Table 3. Lowell Proper Motion Survey Northern Hemisphere.
Supplementary Parallax Codes

and the property of the second	Annual Control of the				a name of account to the state of the state
G001-027	L,S	G063-052	S,A	G141~004	N,Y,S
G003-033	L,S,Y	G063-053	S, A	G142-052	L,N,Y
G005-028	L,Y	G066-032	L,A	G144-025	N,Y
G006-030	L,A	G067-037	S,A	G146-058	L,A,N
	-	G068-024			'
G006-042	S, A	G000-024	S,A	G149-081	$\mathbf{L}^{4}\mathbf{A}$
G007-017	L,Y,N	G069-047	Y,N,L	G150-041	S,A
G008-008	N,A	G074-007	A,Y	G164**564	8,A
G008-055	Y,S	G077-031	L,N	G164-065	B,A
G010-050	S,A	G087-007	N,A,L,S	G164-071	S,A
G012-021	• 1	G087-008	Y,L	G166-053	8,A
G0 12-02 1	L,A	9007-000	1,14	G100055	U/K
G012-043	S,A	G087-012	S,A	G170-012	Y,A
G013-026	L, A	G087-028	N,L	G170-055	S,A
G013-035	L,A	G087-029	N,L	G171-010	L,A,S
G018-016	S,A	G087-043	S,A	G171-019	S,A
G019-020		G089-019	' = '	G171-040	•
9019-020	L,A	G005-015	S,A	G171-040	S,A
G019-024	S,A	G093-048	N,A	G171-048	S,A
G021-015	L,N	G\$#\$−059	L,Y	G173-053	S,A
G022-018	S,A	GU空7-005	N,A	G175-034	Y,A
G022-022	S,A	G097-042	S,A	G176-011	S,A
G024=010	L,N	G097-047		G182~036	
G024=0 10	13 F IA	### 1 0 # 1	S,L	G102-030	LyY
G024-023	S,A	G099-010	Y,N	G185-018	L,Y
G025-022	N, A	G099-017	L,A	G185-037	L,S,A
G026-009	Y,A	G099-033	L,N,Y	G186-031	L,S
G026-010	Y,A,L,N	G099-047	L,A	G191-051	S,A
G028-043	A,N	G102-022		G195-017	
9020-045	AIN	G102-022	S,A	G195-017	S,A
G029-038	L,N,S	G104-037	S,A	G195-018	S,A
G033~049	A,N	G104-049	S,A	G195-019	L,A
G034-015	Y,N,L	G105-023	N,Y	G200-016	S,A
G035-029	L,N	G107-070-		G202-045	S,A
G036-031	•		•		•
9036-031	S,A	G116-052	L,N	G203-051	S,A
G044-040	S,A	G119-052	A,S	G204-027	S,A
G045-020	S,A	G120-045	L,A,N	G205-030	S,A
G046-001	S,A	G120-068	S,A	G210-048	S,A
G049-033	L,A	G121-027	N, A	G216-016	
G050-004	S,A		S,A	G217-007	
30,70004	SIA	G125-029	BIA	G217-007	S,A
G051-015	L,Y	G126-004	S,A	G221-005	Y,A
G054-023	S,A	G126-027	N, A	G225-067	A,Y,L
G055-024	S,A	G128-007	Y, A	G230-026	S,A
G057-029	L,A	G130-005	S,A	G231-019	S,A
G060-032	S,A	G130-006	S,A	G231-043	L,A
2000 UJA	~ / * *	G130-000	IM PAR	URU 1-043	~/~
G060-054	L,Y	G130-043	Y,N	G235-036	S,A
G061-021	L,N	G136-103	N,S	G235-049	S,A
G062-015	L,Y	G137-078	S,A,N,L	G238-044	L,A
G062-053	L,N,S,A	G138-025	Y,N	G259-021	Y,L,N
G063-034	S,A	G139-039	Y,N		-,-,-,
2000 004	~,	G 100 . COS	* * * * * * * * * * * * * * * * * * * *		
G063-036	S,A	G140-024	S,A		

Table 4. Lowell Proper Motion Survey, Northern Hemisphere.
Magnitude Source Reference Key

The state of the s	
E1	Eggen, O. J. 1963, Astron. J. 68. 483.
E2	Eggen, O. J. 1966, Royal Obs. Bull. No. 120.
E3	Eggen, O. J. 1968, Astrophys. J. Suppl. 16, 97 (No. 143).
E4	Eggen, O. J. 1969, Astrophys. J. Suppl. 19, 31 (No. 168).
E5	Eggen, O. J. 1968, Astrophys. J. 153, 195.
EG1	Eggen, O. J. and Greenstein, J. L. 1965, Astrophys. J. 141, 83.
EG2	Eggen, O. J. and Greenstein, J. L. 1965, Astrophys. J. 142, 925.
EG3	Eggen, O. J. and Greenstein, J. L. 1967, Astrophys. J. 150, 927.
ES	Eggen, O. J. and Sandage, A. 1967, Astrophys. J. 148, 911.
G1	Greenstein, J. L. 1969, Astrophys. J. <u>158</u> , 281.
S1	Sandage, A. 1964, Astrophys. J. 139, 442.
52	Sandage, A. 1969, Astrophys. J. 158, 1115.
sĸ	Sandage, A. and Kowal, C. 1962, private communications.
WG	Gliese W. 1969, Catalogue of Nearby Stars, Veröff. Astron. Rechen-Inst. Heidelberg, No. 22.
WA	Wanner, J. F. 1964, Ph.D. Thesis, Harvard University.

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 5 is sufficient for a user to describe the indigenous characteristics of the machine-readable Lowell Proper Motion Survey file to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, tape density, number of tracks, and internal coding (EBCDIC, ASCII, etc.) is not included. This information should always be supplied if secondary copies are transmitted to other users or installations.

Table 5. Tape Characteristics. Lowell Proper Motion Survey, Northern Hemisphere.

NUMBER OF FILES	1
LOGICAL RECORD LENGTH (BYTES)	98
RECORD FORMAT	fb*
TOTAL NUMBER OF LOGICAL RECORDS	8989

^{* ***********} block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS AND REFERENCES

The machine-readable version of the Lowell Proper Motion Survey, Northern Hemisphere was received on magnetic tape from the Centre de Données Stellaires, Strasbourg. As received, the catalog consisted of 80-byte logical records with multiple records for stars having photoelectric data. The following modifications were made to assure easier data processing and greater uniformity with other computerized catalogs:

- 1. The first record, containing only the word "MUCAT", was deleted.
- 2. Multiple 80-byte records were combined while deleting a test digit in byte 80 indicating an additional record, and redundant G numbers on multiple records were removed. The restructuring resulted in the current 98-byte record.
- 3. The machine-readable catalog contains 8989 records. A count of the stars in the published catalog (113 full pages with 75 stars per page and 68 stars on last page) gives 8993; however, stars are missing on pages 28, 29 and 42, resulting in 8989 stars total.
- 4. Preceding zeroes were added to the G numbers to match the published catalog.
- 5. There was no distinction between blank and 0.00 color indices. Initially, all zeroes were converted to blanks for B-V and U-B, then the published catalog was scanned for valid 0.00 values and the values were added for the appropriate stars.
- 6. Plus signs were added to the declinations (byte 15), the color class positive values, and to all positive color indices.
- 7. The following miscellaneous corrections to the published catalog were made to the machine file:

G066-036	photoelectric data deleted as per published version
G213-017	δ° corrected from +39 to +37
G128-032	added BD+32 4584~5

REFERENCES

Giclas, H. L. 1958, Lowell Obs. Bull. 4, 1 (No. 89).

Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1961, Lowell Obs. Bull. 5, 61 (No. 112).

Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1963, Lowell Obs. Bull. 6, 1 (No. 120).

REFERENCES (continued)

- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1964, Lowell Obs. Bull. 6, 103 (No. 122).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1964, Lowell Obs. Bull. 6, 135 (No. 124).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1965, Lowell Obs. Bull. 6, 197 (No. 129).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1966, Lowell Obs. Bull. 6, 233 (No. 132).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1966, Lowell Obs. Bull. 6, 271 (No. 136).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1967, Lowell Obs. Bull. 7, 1 (No. 138).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1967, Lowell Obs. Bull. 7, 31 (No. 140).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1968, Lowell Obs. Bull. 7, 67 (No. 144).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1969, Lowell Obs. Bull. 7, 129 (No. 150).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1970, Lowell Obs. Bull. 7, 149 (No. 151).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1970, Lowell Obs. Bull. 7, 165, (No. 152).
- Giclas, H. L., Burnham, R. Jr. and Thomas, N. G. 1971, Lowell Proper Motion Survey, Northern Hemisphere, The G Numbered Stars (Flagstaff: Lowell Observatory).
- Giclas, H. L., Slaughter, C. D. and Burnham, R. Jr 1959, Lowell Obs. Bull. 4, 136 (No. 102).

SECTION 5 - SAMPLE LISTING

The sample listing given on the following pages contains logical data records exactly as they are recorded on the tape. Groups of records from the beginning and end of the catalog are illustrated. The beginning of each record and bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

	111111 9900000000000 3901234557																					•									
	99999 345678							SK	SK				SK			SK				SK	SK				153 153		SR				
	7778888888889999 78901234567890123	•						8-62 +0-64 +0-37	* 19 +0.96 +0.68				23 +0.81 +0.23			99 *0* 66 *0* 85"				10.97 +1.02 +0.90	3.52 +1.24 +1.14				10.25 +0.74 +0.28		1.14 +0-74 +0.28				*
	123456							*	***	*		S#	*	*2		œ; *	*		*	¥	12.				2		9	•	*2		н
TAPE FILE 27 RECORD LENGTH 98 BITES INPUT VOLSER ADCOOM		G130-037 0 0 5+24139 31100150+2 2 LTT 10001	G171-038 0 018+37444 27174145+2 1	G217-029 0 028+56273 27 84104+1 1 +55 3074	6030-038 0 033+ 6 3 59145168+2 2	G130-038 0 059+36 10 29 94164+3 1	G130-039 0 144+28504 27 76156+2 2 LTT 10008	G030-039 0 147+12407 34 69 93+1 1 LTT 10007 Y19-9539 CI18-3160+	G030-040 0 147+14 82 30212127+1 1 LTT 10004	G217-030 0 150+57474 43 99112+1 2 LTT 10005 B309 C120-1	6130-040 0 221+22595 35 93 91+2 2 LTT 10010 Y25-9203 +22 4950*	G171-039 0 233+45306 85 98122+2 1 LPT 6 CI20-4 GL2 +44 4548*	6130-041 0 3 2+28542 27162144+1 1	G171-040 0 3 3+45321 85 98 97+2 1 LPT 8,9 CI20-6 GL4AB +45 4408*	6030-641 0 3 8+ 7 33 27201154+3 1	G030-042 0 322+17480 29220106+2 1 LTT 10020,1 CI18-4 +17 5036*	G243-013 0 339+58 95 31 39 84+2 1 LTT 10022 I27-14675 GL4.1AB+	6171-041 0 345+43253 29 90165+3 1	6131-019 0 348+17437 62144165 0 1	G031-025 0 357+ 5328 27 76127+1 1 LTT 10024 T5	G630~043 0 359+10 85 31 63139+2 1 LTT 10025 K2-1	G131-020 0 4 4+25355 30 67157+3 1	±243-014 0 411+65223 28105165+2 1	#131-021 0 419+19327 46122157+3 1	G130-042 0 423+27572 27 81117+2 2 LTT 10028 +27 4677	6217-071 0 442+52248 2.8 95138+3 1	G131-023 0 444+20413 29193112+2 1 LTT 10030 Y25-4 +20 5430	G030-044 0 448+10341 33 81150+2 1 LTT 10032	G130-043 0 448-28585 193127157+3 2	G217-032 0 5 4+60 61 33 96153+2 2	G030-045 0 526+ 7439 63221148+4 1 LFT 20
	(7) 22) 22)		7	m	3	ß	vo	_	æ	on.	10	=	12	<u> </u>	#	15	75	17	8	51	70	7	22	23	24	25	56	27	28	73	30
	COLUR READI LEDEL	RECORD	RECORD	BECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	GECORD 55	N RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	BECORD	RECORD	BECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	GECORD

FILE

TAPE

RECORDS PROM

0 P

LISTING

TAPE FILE NAME: LOWELL PROPER HOTION SUR RECORDS 1 TO 30

SK

+0.90

+1.03

10,57

1845 R675

3 LPT

33 95119+1

27 74161+2

3+41504

G171-0362358

8979 6983

RECORD

8978

RECORD RECORD

30 92168+3 56 154+1 29106164+2

6171-035235748+37414 G217-026235752+57372 6241-075235756+64378 G030-0352358 2+17414

RECORD RECORD

6130-033235747+31329

8973 8974 8975 8976 8977

RECORD

RECORD

29 92159+3

SK

+0.72

+0.94

8.82

3 LTT 17080 X18-9754 CL18-3150+

35191103+2

35 55124+2

6129-0542358 5+18125 G030-036235815+16428 17084

LII

27 96130+3

64146162+3

6217-027235839+57168

8983

RECORD RECORD RECOED RCORD RECORD RECORD SECO8D

8984

8981 8982

GECORD RECORD

RECORD

G130-034235849+34

17085 17086

LII

28150151+2

80163+3

6217-028235850+52135

6130-035235851+31

8968

8987

8988 6868

SK

11.28 +0.92 +0.52

1847 R679 CI20-1472

LPT

35 76159+1

LII

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27 44 120+2 73210127+2

6129-057235915+21110 G130-036235922+25439 6171-037235959+43264

Y, SK SK +1.20 +0-13 +0+ +0-65 +0.67 +0.64 7.82 9-20 41112103+1 1 LTT 17068 W1052 Y22-11835 CL18-3144+* 4301# 1 LTT 17072 R2 PUL43-53 +43 4596* 17077 Y18-9750 CI18-3148+ 1 LPT 1843 R252 CI20-1430 +49 +32 4745* 17075 JO +33 4813 20 17069 2 LTT LLI +38 1 LTT 30126 85+1 35 67 108+2 27 71125+2 33221161+3 69135158+3 48 85112+2 29260 94+1 33227112+2 32224150+2 28114143+2 43158156+2 49111156+3 34143142+2 6030-034235613+ 8579 6130-029235616+33279 G129-051235626+20350 5171-030235630+40114 G130-030235644+23515 6130-031235647+32249 6171-031235655+44193 6171-0322357 0+42391 6171-033235711+38239 6217-025235713+49500 6129-052235732+19456 6171-034235741+38461 6031-0212357 7+ 2161 G130-032235731+33547 INPUT VOLSER O 9968 8968 6968 8970 8971 8972 8961 8962 1968 RECORD RCORD RECORD RCORD RECORD RECORD RECORD RECORD RECORD RECORD RECORD RECORD

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LOWELL PROPER ACTION

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